MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS

2018/2019 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER

BACHELOR OF ARTS

SCHOOL OF ARTS AND SOCIAL SCIENCES

COURSE CODE: MAT 1100

COURSE TITLE: QUANTITATIVE SKILL I

DATE: 4TH DECEMBER, 2018 **TIME: 1100 – 1300 HOURS**

INSTRUCTIONS TO CANDIDATES

*Answer **ALL** questions in **Section A** and **ANY** Other **TWO** questions from **Section B***

DO NOT MAKE ANY WRITING ON THIS QUESTION PAPER

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*This paper consists of **FIVE** printed pages.* ***Please turn over.***

SECTION A (30 MARKS)

QUESTION ONE (30 MARKS)

a. Simplify the following expressions:

i. $\frac{x^2+xy}{x^2-y^2}$ **(2 Marks)**

ii. $\frac{x-y}{x+y} - \frac{x}{x-y} + \frac{3xy}{x^2-y^2}$ **(3 Marks)**

b. Define the following terms commonly used in statistics

i. Variable **(1 Mark)**

ii. Inference **(1 Mark)**

iii. Random sample **(1 Mark)**

iv. Parameter **(1 Mark)**

c. Name the stages involved in any statistical enquiry **(5 Marks)**

d. Proof the following properties of summation operator

i.

$$\sum_{i=1}^{n} k = nk \; ; \;\; k \neq 0$$

(2 Marks)

ii.

$$\sum_{i=1}^{n} kX_i = k\sum_{i=1}^{n} X_i$$

iii. **(2 Marks)**

$$\sum_{i=1}^{n} Y_i^2 \neq \left(\sum_{i=1}^{n} Y_i\right)^2$$

iv. **(3 Marks)**

$$\sum_{i=1}^{n} (X_i \pm Y_i) = \sum_{i=1}^{n} X_i \pm \sum_{i=1}^{n} Y_i$$

(4 Marks)

e. The set of observations below shows the number of times that each of 30 public service vehicles plying a certain route was charged with a traffic offence during the month of September 2018

3	0	1	6	0	5	6	2	1	3
6	3	4	0	6	2	3	5	6	0
6	6	5	1	1	5	2	4	0	0

Summarize the data above in a table showing the tally, frequency, cumulative frequency and relative frequencies **(5 Marks)**

SECTION B (40 MARKS)

QUESTION TWO (20 MARKS)

a. The table below shows the 1930 Education Department Expenditure by race in Kenya

RACE	Pupils(in state and state-aided schools only)	Total expenditure in USD	Expenditure per pupil in USD
AFRICAN	6948	232293	33.4
ASIAN	1900	70329	37.0
EUROPEAN	776	140041	180.5
TOTAL	9624	442663	250.9

Represent the total expenditure information in the 3^{rd} column in a pie chart

(8 Marks)

b. The age distribution in years of 60 workers in an organization is as shown below.

63	34	35	38	53	40	40	54	41	55	43	45
29	45	58	31	35	46	46	48	49	59	46	47
54	46	64	38	38	59	36	39	53	42	52	45
44	27	51	39	62	42	41	54	63	22	54	38
22	57	57	37	48	69	43	35	29	44	34	58

i. Using ten class intervals, construct a frequency distribution table for the data. **(5 Marks)**

ii. Hence or otherwise use the given data to construct a frequency polygon **(7 Marks)**

QUESTION THREE (20 MARKS)

a. State two main categories of measures of central tendency **(2 Marks)**

b. Given the following data calculate the arithmetic mean using the indirect method

Variable, x	1	2	3	4	5
Frequency, f	3	5	9	6	2

(5 Marks)

c. State three merits of harmonic mean **(3 Marks)**

d. Given the data below calculate the harmonic mean

Variable,X	5	10	17	24	30	TOTAL
$\frac{1}{X}$						

(4 Marks)

e. Using the data below compute the quartiles, Q_1, Q_2 and Q_3

Variable, X	5	7	9	11	13	15	17	19
Frequency,f	1	2	7	9	11	8	5	4

(6 Marks)

QUESTION FOUR (20 MARKS)

a. Find the mode of the following distribution using the method of grouping

Variable, X	3	4	5	6	7	8	9	10	11
Frequency,f	5	4	6	8	9	7	5	9	4

(6 Marks)

b. Calculate the mean deviation of the following data

Marks	0-10	10-20	20-30	30-40	40-50
Number of students	10	25	30	20	15

(8 Marks)

c. To illustrate a time series with a horizontal pattern, consider the 12 weeks of data in table 1 below

TABLE 1: GASOLINE SALES TIME SERIES

Week	1	2	3	4	5	6	7	8	9	10	11	12
Sales (1000'S of Gallon's)	17	21	19	23	18	16	20	18	22	20	15	22

i. Using table 1 above construct a time series plot for this data. **(4 Marks)**

ii. Calculate the average value for this time series **(2 Marks)**

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